

BIBLIOGRAPHICAL NOTICES.

ART. XIV. *The künstliche Pupillenbildung in der Sclerotica; Nebst einem anhang über die Verpflanzung der hornhaut, Keratoplastik. Nach eigenen Versuchen.* Von Dr. B. STILLING, Gehölsarzt am Landkrankenhaus zu Marburg. Marburg, 1833, 8vo. pp. 144.

On the Formation of an Artificial Pupil in the Sclerotica, with an Appendix on the Transplanting of the Cornea. By Dr. B. STILLING, &c.

THE idea of forming an artificial pupil, by removing a portion of the sclerotic and subjacent coats of the eye, and thus allowing an entrance to the rays of light into the interior of the eye, in those cases of blindness in which the cornea and iris are completely disorganized, while the remaining structure of the eye, with the exception in some cases of the lens and its capsule, are unaffected, appears first to have suggested itself to Autenrieth in the year 1814.

In the month of June, of this year, a female nine years old, was admitted into the hospital at Tübingen, who, in early infancy, in consequence of the small-pox, had lost the sight of both her eyes. The pupils were closed; the anterior chambers were obliterated, in consequence of an adhesion of the iris to the posterior surface of the opaque and contracted cornea. On the edge of the cornea in one eye, there remained a small transparent spot, but altogether insufficient to warrant any hope of success from the formation of an artificial pupil by the separation of the edge of the iris from the ciliary body. The eyes of the girl were in other respects uninjured, and when her face was turned to the sun, she was able to distinguish a very slight degree of light.

In contemplating this case, the idea occurred to Autenrieth, that if an artificial pupil could be formed through the sclerotic and choroid coat, sight might be restored to the patient and to all others similarly circumstanced.

Accordingly a series of experiments upon rabbits and other animals were performed; the result of which proved very satisfactorily, that a portion may be cut out of the sclerotic and subjacent coats of the eye with perfect safety; that the vitreous humour slightly projects at the opening, and that the small tumour thus formed becomes covered with a thin semi-transparent membrane, constituting a kind of vicarious cornea, through which the rays of light pass into the interior chambers of the eye, and give rise to a certain extent of vision.

The experiments alluded to show also, however, that in all probability, but a very imperfect degree of vision can be restored by an artificial pupil formed in the sclerotic—that although the covering membrane of this artificial pupil is at first tolerably transparent, there is a danger of its becoming subsequently opaque, and in this manner destroying the benefit of the operation; and finally, that it is not entirely certain that in the human subject the vitreous humour may not escape entirely through the opening formed through the coats of the eye, or a severe inflammation be induced, by which either the whole eye would be destroyed, or at least a thick layer of coagulable lymph effused so as to close up the artificial pupil.

These serious objections to the proposed operation, our author has very ingeniously, but in our opinion, unsuccessfully, attempted to remove. He admits, however, the very imperfect degree of vision obtained by the operation, even when most successful; which we grant would not be a very valid objection to it, in the cases to which it is alone applicable, could we depend upon its very generally succeeding in all other respects.

A variety of additional experiments, with the view of perfecting the opera-

tion, were subsequently made by Autenrieth, Schmid, Gärtner, Weber, Riecke, Moesner, Müller, Ullmann, Ammon, Hüter and the author.

Riecke appears to have been the first who attempted the operation on the human subject, in a sufficient number of cases at least, to test its feasibility and real value—the result of his experience is by no means however very encouraging.

The following is an outline of the cases in which the formation of an artificial pupil in the sclerotica was undertaken by this gentleman, as described in the work before us.

In 1817, the operation was performed on a female twenty years of age, who after an attack of small-pox in her third year, had remained entirely blind, and was at the same time labouring under chlorosis and a high degree of nervous asthenia. On the fourteenth day after the operation, there was discovered at the spot where the sclerotica was perforated, a small transparent tumour containing a projecting portion of the vitreous humour. Through this the patient was able to distinguish the faces of the by-standers, although somewhat distorted from their natural appearance. In the course of four weeks, the covering of the artificial pupil became somewhat obscured; it was not, however, even at a still later period completely opaque, and continued to afford the patient a partial vision.

In 1820, the operation was performed, first, on a robust country girl, who had become blind from small-pox in early youth. On the eighth day subsequently, the opening through the sclerotica was entirely closed, in consequence of the firm adhesion of its edges. Secondly, on an individual thirty years of age, who had been blind from youth, in consequence of small-pox; on the fourteenth day, the conjunctiva of the upper eyelid was found to be united with the portion of the sclerotica at which the operation had been performed. Thirdly, on a boy fifteen years old, who seven years previously had been rendered blind by an attack of scarlet fever; on the fourteenth day, not the least trace of transparency remained in the membrane covering the opening through the sclerotica.

In all the foregoing cases, the conjunctiva was removed, in the formation of the artificial pupil, in common with the sclerotica, the choroid, and retina. In the two following cases, the conjunctiva was separated from the sclerotica at the spot where the operation was performed, previous to the removal of the latter, and subsequently applied over the opening.

In 1822, the operation was performed on a female eighteen years of age, blind from early youth, in consequence of small-pox. An entirely transparent vicarious cornea was formed. Between the tenth and fourteenth days subsequent to the operation, the patient saw very distinctly the outlines of large objects. Three weeks afterwards, however, the muscles of the eye became affected with severe spasms, and the projecting transparent membrane of the artificial pupil was burst; the humours of the eye escaped, and its coats collapsed. At the end of two weeks, the ball of the eye was filled up to its original size, but no trace remained of the artificial pupil.

The same year the operation was also performed on a female thirty years of age, who had been blind from her youth, in consequence of the small-pox. A beautiful round pupil was the result, through which the patient was able to distinguish the outlines of any large object. In the course of three weeks, the covering membrane of this artificial pupil began to lose its transparency. Complete opacity did not however occur; and several months subsequently, the patient was able to distinguish light and darkness to a much greater degree than she had been previous to the operation.

From the results of the foregoing cases, Riecke has drawn the following general deductions.

1. Notwithstanding the preservation of a portion of the conjunctiva, to form a covering to the opening made through the sclerotica and subjacent coats of the eye, is an important improvement in the operation, yet the history of the first four cases, as well as numerous experiments on animals, shows, that the artificial pupil, without the covering of the conjunctiva, often remains for a considerable

rahle time transparent. Even when an opaque layer of the conjunctiva forms over the opening made in the sclerotica, this may be often removed by a knife or scissors, so as to restore transparency to the artificial pupil. To secure the portion of conjunctiva over the part operated on, it is better, according to Rieche, to attach it by a suture.

2. It is absolutely necessary that the opening through the coats of the eye be perfectly circular and not too small, in order to prevent the junction and consequent adhesion of its edges. To form such an opening, he prefers a double edged curved staphyloma knife.

3. In order that the operation may be successful, in every case, a slight projection of the vitreous humour must be produced. In the lower class of animals, this occurs readily of itself, in consequence of the pressure of the strong muscles of the eye, but in man, pressure on the ball of the eye will be necessary to cause and maintain a sufficient projection of the vitreous body.

4. The formation of what has been termed a *cornea succenturiata* is very much to be doubted. The wound in the sclerotica is not closed by a transparent cicatrix, it being occupied completely by the hyaloid membrane.

5. The transparency of the hyaloid membrane always becomes somewhat diminished, but it never becomes as opaque as the sclerotica. The discovery of the means capable of preventing this loss of transparency, is much to be desired, in order to the perfection of the operation.

6. In reference to this operation, the change which occurs in the conjunctiva subsequent to *ophthalmia scarlatinosa*, as in the fourth case referred to above, demands particular attention; in all the other cases, where blindness was the result of small-pox, the conjunctiva was entirely unchanged from its normal condition.

The operation for the formation of artificial pupil in the sclerotica, was performed subsequently by J. B. Müller, but without any permanent benefit; and in 1827, it was performed by Professor Ullman. The patient, a man thirty-three years old, blind from his sixth year, in consequence of a wound of the right eye, and a subsequent hypopion of the left eye. For a short time subsequent to the operation, the patient enjoyed, to use the words of our author, "as perfect a degree of sight as under the circumstances of the case could be expected;" but finally, the artificial pupil was completely obliterated, and the patient reduced to a state of perfect blindness.

In the two or three instances in which the operation was performed by Professor Ammon, it was attended with scarcely more beneficial results. As deductions from the cases operated on by the latter gentleman, we are presented with the following.

1. That neither the form of the eye nor the sensibility to light which still exists in the diseased eye, suffer any prejudice in consequence of the operation for forming an artificial pupil through the sclerotica; on the contrary, in a few cases, the patients were of opinion, that in the clear light of day or in an artificial light, their power of vision was increased by the operation; this was particularly observed in a case in which the patient in consequence desired that the operation might be performed on both eyes. It is worthy of remark, that the excision of a portion of the sclerotica scarcely ever induces any inflammation of this membrane—in no one of the cases in which the operation was performed by the Professor, was a trace of it observed—and all three of the patients were able to use their eyes on the first, second and third days after the operation.

2. The operation for the formation of an artificial pupil through the sclerotica, does not deserve the oblivion in which it has already fallen. It has been too soon and rashly condemned, before the result of extensive experience as to its worth could be obtained.

After presenting a very full, candid and interesting account of the observations and experience of others in reference to this operation, Dr. Stilling next gives the detail of his own repeated experiments, the general results of which are thus summed up.

1. In the formation of the artificial pupil, it is necessary to remove a portion of the conjunctiva as well as of the sclerotica, chorioidea and retina. By retaining the first, we endanger the transparency of the vicarious cornea.

2. The form of the excised portion of the above coats of the eye should be either square or circular; a triangular opening is apt to close by the adhesion of its edges.

3. The artificial pupil is most appropriately formed partly in the sclerotica and partly in the cornea—a portion of the latter, with the iris and corpus ciliare being removed at the same time with a portion of the remaining coats of the eye.

4. The membrane covering the artificial pupil is not the original conjunctiva, nor is it proper it should be, but is formed by an effusion of coagulable lymph from the wounded edges of the sclerotica.

According to our author, the operation is proper in all cases in which the cornea and iris are become completely disorganized; when the iris is adherent to and inseparable from the cornea, or when the anterior or posterior chambers of the eye or both of them are filled with an opaque exudation which cannot be removed—and when at the same time the remaining structure of the eye, the retina, chorioidea, and sclerotica are unchanged from their normal condition.

The operation is contraindicated in cases of amaurosis, atrophy of the globe of the eye, synchysis, hydrops bulbi, varicositas oculi, deep-seated constitutional disease, and all other conditions of the eye, as well as of the entire organism in which the operation for cataract is contraindicated. The operation is likewise contraindicated when one eye only is diseased in the manner above described, provided the other is still unaffected. For even when the operation is the most successful, the disturbance of vision caused by the operation, may affect injuriously the sight of the sound eye—and the consequent deformity can scarcely be relieved by the use of glasses, as Schmid supposes.

The manner of performing the operation preferred by our author, is thus described by him.

The instrument required is one invented by Banger; it consists of three lancet-shaped blades, fastened in the extremity of a square handle, in such a manner as to be perfectly firm, but at the same time readily removed when required. The largest blade is placed horizontally; it is sharp on both of its edges—the two other blades are placed perpendicularly, one on each edge of the horizontal blade; forming with the latter a kind of square trough—their points recede from six to eight lines behind that of the horizontal blade, and are covered by a small projection on the sides of the latter; the cutting edges proceed upwards, and are of an ovoid shape. All the blades gradually increase in breadth from the point towards the handle. The greatest breadth of the horizontal blade, at the spot where the points of the perpendicular blades commence, is from two to two and a half lines; and the greatest height of the perpendicular blades is the same. Besides this instrument, a Daviel's scissors and a forceps will sometimes be required, to remove any shreds of the conjunctiva or chorioidea which may happen to present themselves at the edges of the opening.

The size of the portion to be excised from the coats of the eye should be about two to two and a half lines in diameter, whether square or round. The excision of a larger portion will endanger the prolapsus of the lens, or at least of too great a portion of the vitreous humor, which, if possible, is to be avoided, as the consequent collapse of the eye, by causing the edges of the opening to approach each other and to adhere, will be apt to destroy all the benefit of the operation. If the portion removed, on the other hand, be too small, the field of vision will be too much circumscribed, and even should the opening not be obliterated by adhesion of its edges, the benefit to the patient from the operation will be trifling.

Dr. Stilling prefers the formation of the artificial pupil, partly on the cornea and partly on the sclerotica, on the side corresponding with the outer angle of the eye. The centre of the portion to be excised being marked by the point at

which a line passing through the horizontal diameter of the pupil is crossed by another passing perpendicularly along the inner edge of the cornea.

The patient is to be placed as in the operation for cataract, his upper eyelid being raised by an assistant. The surgeon holding the instrument by the handle between his thumb, index and middle fingers—the thumb being applied on the upper, and the two fingers on the lower side of it—so that the edges of the upright blades are presented upwards, rests his little finger on the patient's cheek-bone, and with the index finger of the free hand, draws down the under eye-lid. The patient being directed to turn his eye towards the inner angle, the point of the horizontal blade of the instrument is to be introduced perpendicularly into the sclerotica, at a proper distance from the cornea, and passed through all the coats of the eye to the vitreous humour; the handle is then to be turned towards the temple, so as to bring the point of the blade beneath the coats of the eye, between which and the vitreous humour, it is to be passed about two and a half lines in the direction of the cornea, when it is to be again passed on through the iris and cornea; which will the more easily be effected if the horizontal blade is slightly curved upwards. The edges of the upright blades are now presented against the upper and lower angles of the external wound, and by pushing forward the instrument, cut out a square portion of all the coats of the eye, between the two incisions made by the horizontal blade. The blood being now gently washed away from the eye, any shreds of the membranes that may remain attached to the edges of the wound are to be seized with a forceps and removed by means of a David's scissors. The patient is to be confined to a darkened chamber, his eye being covered with a light simple dressing. Care is to be taken to prevent the occurrence of inflammation, and if any symptoms of the latter occur, they are to be combated with the usual remedies.

So far as the mere excision of the coats of the eye is concerned the described operation, when carefully performed, is entirely without danger, or any serious inconvenience. But in reference to its value as a means of restoring a useful degree of vision to the blind in certain cases, there are many circumstances, which, according to the admissions of our author, who is its professed advocate, render this extremely problematical.

When most successful, the transparency of the membrane covering the artificial pupil, is always more or less imperfect, and, consequently, from this circumstance alone, the degree of vision it admits of, is always trifling and obscure. In the most favorable cases, the patient is only able to distinguish between day and night, or the most striking colours, &c., of the largest objects; but more generally, he can distinguish only between light and darkness. The imperfect refraction of the light, from the want of a crystalline lens behind the artificial pupil, by which the patients are rendered myopic, detracts also from the value of the operation, as it is hardly possible to remedy this defect by artificial means.

When after the formation of an artificial pupil through the sclerotica, a tolerable degree of vision has been restored; this has become soon diminished, and finally, entirely destroyed by the more or less gradual destruction of the transparency in the closing membrane of the pupil—and although this may in some cases be obviated by the removal of the opaque membrane, there is still a danger of the one subsequently formed, becoming in its turn likewise opaque.

In one case at least, in which the operation was performed on the eye of a dog, a severe inflammation was induced, followed by suppuration, and finally, horning of the globe of the eye. Hydrophthalmia was also induced in another instance; while a thickening of the conjunctiva with the development of large vessels, similar to pterygium occurred in two instances. In one instance, an adhesion took place between the conjunctiva palpebræ, and the wound in the sclerotica; and amaurosis was of frequent occurrence after the operation—more especially, however, when in performing it, the eye was dragged forcibly forwards, and otherwise roughly handled.

Whether future and more extensive experience will enable us to improve this operation so as to render it of more advantage in the first instance, and to prevent the occurrence of the unfortunate results above attended to, must, of course, be left for time to determine.

In the Appendix, Dr. Stilling presents a brief account of his experiments on the transplantation of the cornea. He found that if in the eye of a rabbit, an artificial pupil is made through the sclerotica, and immediately a portion of the cornea, cut from the eye of another rabbit, is accurately applied so as to cover the artificial pupil and retained in its place by a delicate suture, it will adhere without losing to any great extent its transparency. In one case, the transplanted cornea remained unchanged for six months. How far the transplanting of the cornea of a brute into the human eye will succeed, and what amount of advantage is to be derived from the operation, the facts detailed by our author are insufficient satisfactorily to prove.

D. F. C.

ART. XV. *Appréciation de la Doctrine Phrénologique ou des localisations des Facultés Intellectuelles et morales, au Moyen de l'Anatomie Comparée.* Par M. JULES LAFARGUE, ancien interne des hôpitaux.

An appreciation of the Phrenological doctrine, or the localisation of the intellectual and moral faculties, by means of comparative anatomy. By M. J. LAFARGUE.

THE article, the title of which is given above, is contained in the *Archives Générales de Médecine* for March, April and June, 1838. It formed originally a part of the memoir addressed by M. Lafargue to the Society of Medicine of Bordeaux, in reply to the prize question proposed by that body—"To determine by argument, by comparative and pathological anatomy, and by physiological experiments, what is positive in regard to the localization of the functions of the Brain?"

The author has attacked the doctrine in all its details. He has attempted to show by an examination of the heads of the various vertebrated animals, and a comparison of their respective forms and dimensions, that the localization of the functions of the brain, or to speak more accurately, the localization of the phrenological organs as taught by the advocates of that doctrine, is altogether untrue. And really, if we are to receive the statements of M. Lafargue as established facts, and admit the validity of his deductions, the article before us can be viewed in no other light than as a complete and satisfactory refutation of the doctrine of phrenology.

The accuracy or inaccuracy of the author's alleged facts, and of his leading inferences, can only be established by a careful examination and comparison of the skulls of the different classes of animals. By cautiously noticing the peculiarity of conformation of the head in the individuals of each class or species, and comparing this with their known habits and disposition, we shall very speedily discover whether the views of M. Lafargue, or the Doctrines of Phrenology have their foundation in nature.

According to M. Lafargue, Phrenology cannot be true, Because—

1st. In certain classes of animals, the pachydermata for example, the form of the brain cannot be determined by that of the external skull.

2dly. In the mammalia, the form of the cranium and of the brain is altogether dependent upon the mechanical organization of the skeleton, especially in reference to the mode of station, progression, and mastication of the animals.

3dly. The development of the occipital crest is in exact proportion with the height of the animal, and the weight of the face—that of the interparietal is in direct proportion to the strength of the jaws, and in inverse proportion to that of the brain.

4thly. Hence, in all the individuals of different groups or species of animals, the conformation of the cranium is the same; thus animals whose habits and dispositions are precisely similar, differ in the conformation of their heads, from the difference in their attitudes and mode of mastication, while those whose habits and dispositions are dissimilar, resemble each other in the form of their skulls and brain, because their attitude and mode of mastication are alike.

5thly. Whenever any one portion of the brain is more or less developed, there